

Oracle® Banking Corporate Lending

Multi-Tenant Patch-set Deployment



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Preface

This topic contains the following sub-topics:

- [Purpose](#)
- [Acronyms and Abbreviations](#)
- [Audience](#)
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- [Conventions](#)
- [Diversity and Inclusion](#)
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Purpose

This manual is designed to help you quickly get acquainted with the Oracle Multi Tenant Patchset deployment in Oracle Banking Corporate Lending.

Acronyms and Abbreviations

The list of the acronyms and abbreviations used in this guide are as follows:

Table 1 Acronyms and Abbreviations

Abbreviation	Description
CDB	Container Database
EAR	Enterprise Archive file
MIS	Management Information System
PDB	Pluggable Database
SMS	Security Management System
SQL	Structured Query Language
UDF	User Defined Field
URL	Uniform Resource Locator

Audience

This manual is intended for the following User/User Roles

Table 2 Audience

Role	Function
Implementation team	Implementation of Oracle Banking Corporate Lending Solution
Presales team	Install Oracle Banking Corporate Lending for demo purpose
Bank personnel	Who installs Oracle Banking Corporate Lending

This guide is intended for IT administrators, developers, WebLogic admin or ops-web team who are responsible for installing OFSS Banking Products. The user of this manual is expected to have basic understanding of Application servers like Oracle Weblogic and Oracle Database.

Critical Patches

Oracle advises customers to get all their security vulnerability information from the Oracle Critical Patch Update Advisory, which is available at [Critical Patches, Security Alerts and Bulletins](#). All critical patches should be applied in a timely manner to make sure effective security, as strongly recommended by [Oracle Software Security Assurance](#).

Conventions

The following text conventions are used in this document:

Table 3 Conventions and Meaning

Convention	Meaning
boldface	Boldface type indicates graphical user interface elements associated with an action, or terms defined in text or the glossary.
<i>italic</i>	Italic type indicates book titles, emphasis, or placeholder variables for which you supply particular values.
monospace	Monospace type indicates commands within a paragraph, URLs, code in examples, text that appears on the screen, or text that you enter.

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Related Resources

For more information, refer *Multi-Tenant Deployment User Manual*.

Screenshot Disclaimer

Personal information used in the interface or documents is dummy and does not exist in the real world. It is only for reference purposes.

1

Overview of Applications in an Application Container

This topic contains following sub-topics:

- [Managing Applications in an Application Container](#)
In an application container, an application is the named, versioned set of application common objects stored in the application root. In this context, “application” means “application back-end.” Application common objects include user accounts, tables, PL/SQL packages, and so on. An application can be shared with the application PDBs that belong to the application root.
- [Application Maintenance](#)
Application maintenance refers to installing, uninstalling, upgrading, or patching an application.

1.1 Managing Applications in an Application Container

In an application container, an application is the named, versioned set of application common objects stored in the application root. In this context, “application” means “application back-end.” Application common objects include user accounts, tables, PL/SQL packages, and so on. An application can be shared with the application PDBs that belong to the application root.

On performing application changes, application PDBs can synchronize with the application in the application root. The application container also manages the versions of the application and the patches to the application:

- While installing an application, user must specify the application version number.
- While upgrading an application, user must specify the old application version number and the new application version number.

As the application evolves, the application container maintains all of the versions that are applied.

1.2 Application Maintenance

Application maintenance refers to installing, uninstalling, upgrading, or patching an application.

Perform application installation, upgrade, and patching operations using an ALTER PLUGGABLE DATABASE APPLICATION statement.

The basic steps for application maintenance are as follows:

1. Log in to the application root.
2. Begin the operation with an ALTER PLUGGABLE DATABASE APPLICATION ... BEGIN statement in the application root.
3. Execute the application maintenance statements.
4. End the operation with an ALTER PLUGGABLE DATABASE APPLICATION ... END statement.

These statements can be issued in the same user session or in different user sessions.

- [Application Installation](#)
- [Application Upgrade](#)

1.2.1 Application Installation

An application installation is the initial creation of a master application definition. A typical installation creates user accounts, tables, and PL/SQL packages.

Refer *Multi-Tenant Deployment* document for more details on the application installation.

1.2.2 Application Upgrade

An application upgrade is a major change to an installed application.

Typically, an upgrade changes the physical architecture of the application. For example, an upgrade might add new tables, and packages, or alter the definitions of existing objects.

To upgrade the application, specify the following in the ALTER PLUGGABLE DATABASE APPLICATION statement:

- Name of the application
- Old application version number
- New application version number

During an application upgrade, the application remains available. To make this availability possible, Oracle Database clones the application root.

The following figure gives an overview of the application upgrade process.

Figure 1-1 Begin Upgrade

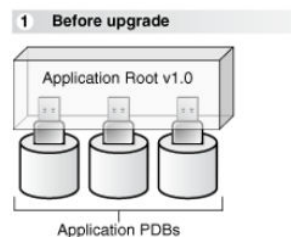


Figure 1-2 Begin Upgrade

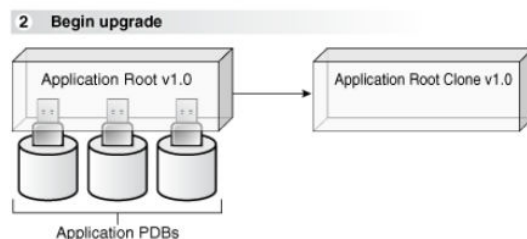
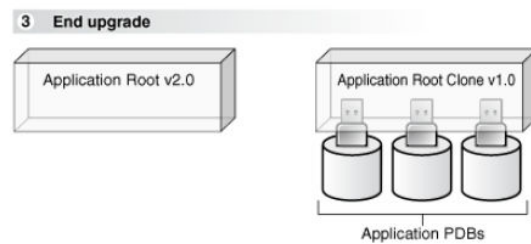
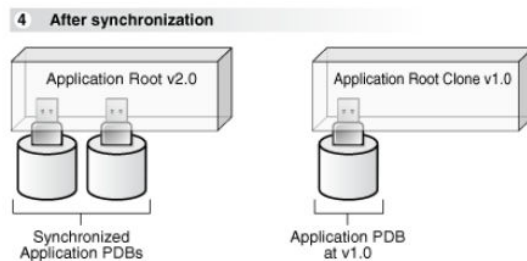


Figure 1-3 End Upgrade**Figure 1-4 After synchronization**

When an application is upgraded, Oracle Database automatically clones the application root.

During the upgrade, application PDBs point to the clone and applications continue to run during the upgrade. Application PDBs can perform DML on metadata-linked and tables and views and query data-linked tables.

After the upgrade, the application root clone remains and continues to support any application PDB that still uses the pre-upgrade version of the application in the clone.

Application PDBs that re synchronized are pointed to the upgraded application root. Application PDBs that are not synchronized might continue to use the clone.

2

Patch-set Application Steps

Multi entity application root/PDB based setup has to be available to perform 18c database application upgrade for applying the patch-set. Refer Multi-Tenant_Deployment.docx for the deployment and installation steps.

Patch-set can be applied by following below steps in sequential order, and detail of each steps explained as separate sections subsequently.

- Application Upgrade
- Synchronize application PDBs

Patch-set Deployment Pre-requisites:

Download the required patch-set zip file and unzip it in a local path.

Verify whether the property files (fcubs.properties and env.properties) have the application root schema details where the application is available, if not update the approot schema details through installer (Refer Property_File_Creation document for more details) and re-generate the files.

Make sure to set the flag PATCHSET_INSTALLATION to 'Y'.

- [Purpose](#)
- [Steps to be Followed](#)
- [Synchronize application PDBs](#)

2.1 Purpose

Synchronizing an application updates the application in the application PDB to the latest version in the application root. When an application is upgraded in an application root, an application PDB that belongs to the application root is not changed until it is synchronized.

Application PDBs synchronize with an application by running an ALTER PLUGGABLE DATABASE statement with the SYNC clause.

2.2 Steps to be Followed

Below steps to be followed to initiate application upgrade:

- [Start Application Upgrade](#)
- [Compiling Incremental Units](#)
- [Recompilation of invalids](#)
- [End Application upgrade](#)
- [Start Application upgrade](#)
- [Application Root Objects Conversion for New Objects](#)
- [Application Root Objects Conversion for Existing Objects](#)

- [Recompilation of Invalids](#)
- [End Application Upgrade](#)

2.2.1 Start Application Upgrade

An ALTER PLUGGABLE DATABASE APPLICATION statement has to be issued to upgrade an application in the application root.

Each upgrade must be associated with an application name, starting version number, and ending version number.

- The common user must have the DBA privilege, and the privilege must be commonly granted in the application root.
- The application root must be in open read/write.
- Run the below script for initiating an application upgrade. This will initiate the application from current version to the next version (patch-set version).

[01_Start_Upgrade.sql](#)

Input sample for the script:

Table 2-1 Input sample for the script:

Spool Path	<< Any local path>>
Application next version	14.4.0.0.0

2.2.2 Compiling Incremental Units

Patch-set objects have to be loaded using bat file [E.g.: SMSDBCompileRun.bat, TFDBCompileRun.bat] by silent installer for respective product processor.

Compile the incremental SMS units using /INSTALLER/SOFT/SMSDBCompileRun.sh for UNIX installations or /INSTALLER/SOFT/SMSDBCompileRun.bat for Windows installations.

Compile the incremental OBCL units using /INSTALLER/SOFT/TFDBCompileRun.sh for UNIX installations or /INSTALLER/SOFT/TFDBCompileRun.bat for Windows installations.

2.2.3 Recompilation of invalids

As the sharing property of most of the objects are modified other than NONE, recompilation of objects is not allowed outside an application.

Recompilation of objects will be initiated inside the application upgrade for sanity with zero invalids with the below script:

[03_Invalids_Recompilation_Inside_Upgrade.sql](#)

2.2.4 End Application upgrade

Application upgrade can be performed in the application root only and end of the upgrade is performed with an ALTER PLUGGABLE DATABASE APPLICATION END UPGRADE statement.

Run the below script for ending an application upgrade for patch-set.

[04_End_Upgrade.sql](#)

And run the invalid script by connecting to the common user in approot outside the upgrade.

[04_Invalids_Recompilation_Outside_Upgrade.sql](#)

2.2.5 Start Application upgrade

Run the below script for initiating another application upgrade for object conversion. This will initiate the application from current version to the next version (patch-set version).

[05_Start_Upgrade.sql](#)

Input sample for the script:

Table 2-2 Input sample for the script:

Spool Path	<< Any local path>>
Application next version	14.4.0.0.0

2.2.6 Application Root Objects Conversion for New Objects

As part of patch-set when there are new tables added which has to be converted as DL or when there is a new function id which is identified to be an approot function is provided, otherwise no conversion will happen as part of this step

Below script takes care of converting the new DL objects during patch-set based on the deployment model of the application during installation.

[06_New_Object_Conversion.sql](#)

Input sample for the script:

Table 2-3 Input sample for the script

Spool Path	<< Any local path>>
Application next version	14.4.0.0.0

2.2.7 Application Root Objects Conversion for Existing Objects

Various Sharing types of objects during installation:

- A static table will hold the information of selected table sharing as Data link. Other tables will be treated as Meta Data Link
- Sharing of object types such as INDEX, LOB, TABLE PARTITION, SEQUENCE, and DYNAMIC PACKAGES will remain as NONE.
- All other object types such as Packages, Procedures, Functions, and Synonyms would be converted as Meta Data Link sharing.

Sharing during upgrade:

Sharing of existing database objects will remain the same.

Below script takes care of converting the modified MDL objects when there is a re-creation [objects with Create or Replace command during creation] happens during patch-set.

[07_Object_Conversion.sql](#)

Input sample for the script:

Spool Path	<< Any local path>>
Application next version	14.4.0.0.0

When there are new tables introduced as part of patch-set which has to be converted into DL will be done separately. The recommendation for the same will be provided as part of patch-set instructions for this case.

2.2.8 Recompilation of Invalids

As the sharing property of most of the objects are modified other than NONE, recompilation of objects is not allowed outside an application.

Recompilation of objects will be initiated inside the application upgrade for sanity with zero invalids with the below script:

[08_Invalids_Recompilation_Inside_Upgrade](#)

2.2.9 End Application Upgrade

Application upgrade can be performed in the application root only and end of the upgrade is performed with an ALTER PLUGGABLE DATABASE APPLICATION END UPGRADE statement.

Run the below script for ending an application upgrade for patch-set.

[09_End_Upgrade.sql](#)

And run the invalid script by connecting to the common user in approot outside the upgrade.

[09_Invalids_Recompilation_Outside_Upgrade.sql](#)

2.3 Synchronize application PDBs

This topic contains following sub-topics:

- [Purpose](#)
- [Steps to be Followed](#)

2.3.1 Purpose

Synchronizing an application updates the application in the application PDB to the latest version in the application root. When an application is upgraded in an application root, an application PDB that belongs to the application root is not changed until it is synchronized.

Application PDBs synchronize with an application by running an ALTER PLUGGABLE DATABASE statement with the SYNC clause.

2.3.2 Steps to be Followed

Prerequisites

- The current user must have ALTER PLUGGABLE DATABASE system privilege.
- Ensure that the current container is the application PDB.
- Run an ALTER PLUGGABLE DATABASE APPLICATION statement with the SYNC clause.
- Run the below script to synchronize the PDBs with the latest application changes in the application root.

[10_PDB_Sync.sql](#)

3

Step by Step Execution

This topic contains following sub-topics:

- [Pre-Requisites](#)
This topic provides systematic instructions for pre-requisites.
- [Patch-set Application Step by Step with Screenshots](#)
This topic provides systematic instructions to patch-set application step by step with screenshots.

3.1 Pre-Requisites

This topic provides systematic instructions for pre-requisites.

1. Before applying the patch-set, we have to make sure the release is updates with the base version of the patch-set.

For Example, If the first patch-set of 14.2 is yet to applied, the release has to be updated as '14.2.0.0.0'. It can be verified with the below queries.
`select param_name, param_val
from CSTB_PARAM WHERE PARAM_NAME = 'RELEASE';select module_group_id, release
from SMTB_MODULES_GROUP;`

2. Another significant parameter is the values of application name and deployment type in CSTB_PARAM.

This value will be updated from the installer during Approot Object Conversion utility as part of deployment.
`select param_name, param_val from cstb_param where PARAM_NAME
in ('MULTI_TENANT_APP_NAME', 'MULTI_TENANT_DEPLOYMENT_MODEL');`

The Application name of multi-tenant deployment will be stored in CSTB_PARAM as

Table 3-1 Parm name and Parm Val

Param_Name	Param_Val
MULTI_TENANT_APP_NAME	OBCL

The type of object conversion will be stored in CSTB_PARAM as

Table 3-2 Parm name and Parm Val

Param_Name	Param_Val
MULTI_TENANT_DEPLOYMENT_MODEL	SA (or) SAUA (or) SASDD (or) SASDC

- SA - Shared Application
- SAUA - Shared Application User Authentication
- SASDD - Shared Application Shared Data - Default
- SASDC - Shared Application Shared Data – Custom

3.2 Patch-set Application Step by Step with Screenshots

This topic provides systematic instructions to patch-set application step by step with screenshots.

1. Start Application upgrade

- a. Login into the Approot Schema as Common user.
- b. Run 01_Start_Upgrade.sql for initiating the application upgrade.
- c. User input has to be inputted for the below:

Table 3-3 Input sample for the script

Input Type	User Input
Spool Path	<< Any local path>>
Application next version	14.4.0.0.0

- d. Script will be executed as in the screen shot below and keep the SQL Plus session open for upcoming steps.

Execution Screenshot:

Figure 3-1 Start Application Upgrade

```

SQL> SPOOL ON
SQL> SET SQLBLANKLINES ON
SQL> SET SERVEROUTPUT ON
SQL> SET ERRORLOGGING ON
SQL> SET ECHO ON
SQL> prompt Welcome to Application PDB Configuration
Welcome to Application PDB Configuration
SQL> SPOOL "&SPOOL_PATH"
Enter value for spool_path: D:\FCUBS_14.3\Upgrade_Patchset_Approach\Documents\Review\Attachment\AVAILS\01Spool.txt
SQL>
SQL> DECLARE
2   l_app_name          VARCHAR2(128);
3   l_app_currver       VARCHAR2(38);
4   l_sql               VARCHAR2(256);
5 BEGIN
6
7   BEGIN
8     SELECT app_name
9     INTO l_app_name
10    FROM dba_applications
11    WHERE app_implicit <> 'Y'
12    AND app_name = (SELECT param_val FROM cstab_param WHERE Param_name = 'MULTI_TENANT_APP_NAME');
13  EXCEPTION
14    WHEN NO_DATA_FOUND THEN
15      dbms_output.put_line('Error Nodata--->'||SQLERRM);
16    WHEN OTHERS THEN
17      dbms_output.put_line('Error others--->'||SQLERRM);
18  END;
19  SELECT MAX(app_version)
20  INTO l_app_currver
21  FROM dba_app_versions
22  WHERE app_name = l_app_name;
23
24  l_sql := 'ALTER PLUGGABLE DATABASE APPLICATION ' || l_app_name || ' BEGIN UPGRADE ''' || l_app_currver || ''' TO ''' || '&P_APPLICATION_NEXTVER' || '''';
25  dbms_output.put_line('l_sql: ' || l_sql);
26  EXECUTE IMMEDIATE l_sql;
27
28  l_sql := 'ALTER SYSTEM SET DEFAULT_SHARING = NONE';
29  dbms_output.put_line('l_sql: ' || l_sql);
30  EXECUTE IMMEDIATE l_sql;
31
32  EXCEPTION
33    WHEN OTHERS THEN

```

Figure 3-2 Start Application Upgrade

```

C:\app\client\gribalec\product18.0.0\client_1\bin\sqlplus.exe
14      WHEN NO_DATA_FOUND THEN
15          dbms_output.put_line('Error Nodata--->'||SQLERRM);
16      WHEN OTHERS THEN
17          dbms_output.put_line('Error others--->'||SQLERRM);
18      END;
19      SELECT MAX(app_version)
20      INTO l_app_currver
21      FROM dba_app_versions
22      WHERE app_name = l_app_name;
23
24      l_sql := 'ALTER PLUGGABLE DATABASE APPLICATION ' || l_app_name || ' BEGIN UPGRADE ' || l_app_currver || ' TO ' || l_app_currver || ' ' &p_APPLICATION_NEXTVER ' || '''';
25      dbms_output.put_line('l_sql: ' || l_sql);
26      EXECUTE IMMEDIATE l_sql;
27
28      l_sql := 'ALTER SYSTEM SET DEFAULT_SHARING = NONE';
29      dbms_output.put_line('l_sql: ' || l_sql);
30      EXECUTE IMMEDIATE l_sql;
31
32  EXCEPTION
33      WHEN OTHERS THEN
34          dbms_output.put_line('Error --->'||SQLERRM);
35  END;
36  /
Enter value for p_application_nextver: 14.2.0.0.2
SQL>
SQL> SET ERRORLOGGING OFF
SQL> SPOOL OFF
SQL>
SQL procedure successfully completed.
SQL>

```

2. Compiling Incremental Units

- a. Make sure that the fcubs.properties and env.properties are updated with approot schema details.
- b. Run the <Product Processor>DBCompileRun.bat from <Patchset>\INSTALLER\SOFT directory. DDL Compilation, Object Compilation and Static Data load will be done.

For Example: OBCL INSTALLATION

First load SMS objects first and then OBCL objects. i.e. Run SMSDBCompileRun.bat and after SMS object loading is completed, then initiate OBCL compilation Run TFDBCompileRun.bat

3. Recompilation of invalids

- a. Login into the Approot Schema as Common user
- b. Run 03_Invalids_Recompilation.sql for recompiling the invalids during application upgrade.
- c. No user input is required for this step.
- d. Script will be executed as in the screen shot below and keep the SQL Plus session open for upcoming steps.

Execution Screenshot:

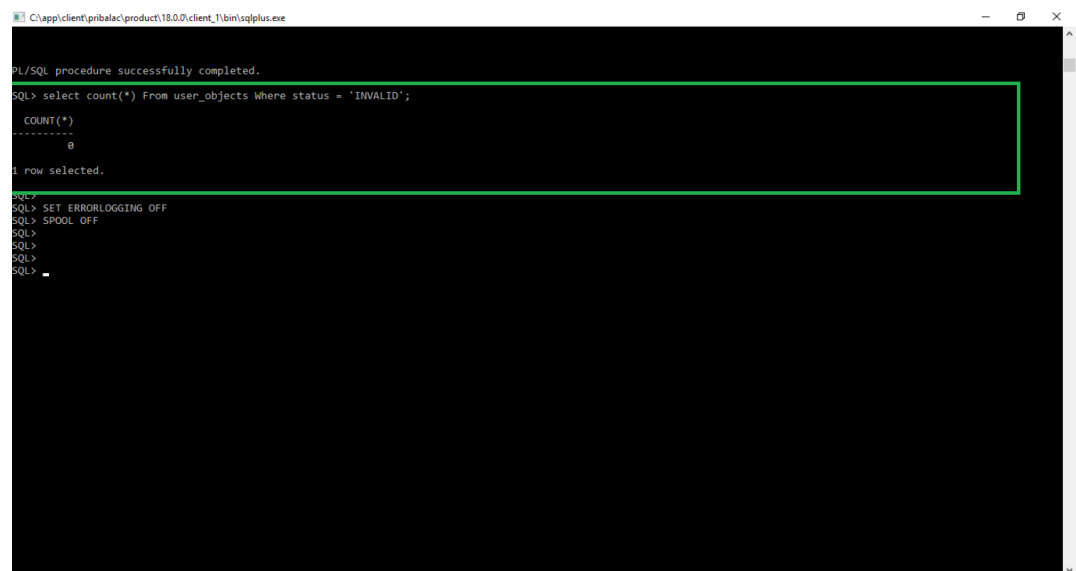
Figure 3-3 Recomp



```
C:\app\client\primalac\product\18.0.0\client_1\bin\sqlplus.exe
SQL> prompt Welcome to Application Upgrade Invalids Recompilation
Welcome to Application Upgrade Invalids Recompilation
SQL> SPOOL "85POOL_PATH"
Enter value for spool_path: D:\FCUBS_14.3\Upgrade_Patchset_Approach\Documents\Review\Attachment\AVAILS\05Spool.txt
SQL>
SQL> DECLARE
2   inval_cnt NUMBER := 0;
3 BEGIN
4   WHILE inval_cnt < 3 LOOP
5     --SCRIPT
6     FOR j IN (Select 'alter ' || object_type || ' ' || object_name || ' compile' invalidobject1
7               FROM user_objects
8               WHERE status = 'INVALID'
9               AND object_type IN ('VIEW','SYNONYM','PROCEDURE','FUNCTION','PACKAGE','TRIGGER')
10              )
11     LOOP
12       DBMS_OUTPUT.PUT_LINE(chr(10));
13       EXECUTE IMMEDIATE j.invalidobject1;
14     END LOOP;
15     inval_cnt := inval_cnt + 1;
16   END LOOP;
17 END;
18 /

PL/SQL procedure successfully completed.
SQL>
SQL> DECLARE
```

Figure 3-4 Recomp



```
C:\app\client\primalac\product\18.0.0\client_1\bin\sqlplus.exe

PL/SQL procedure successfully completed.
SQL> select count(*) From user_objects Where status = 'INVALID';
COUNT(*)
-----
0
1 row selected.
SQL>
SQL> SET ERRORLOGGING OFF
SQL> SPOOL OFF
SQL>
SQL>
SQL>
SQL>
```

4. End Application upgrade

- a. Login into the Approot Schema as Common user.
- b. Run 06_End_Upgrade.sql for recompiling the invalids during application upgrade.
- c. No user input is required for this step.
- d. Script will be executed as in the screen shot below.

Execution Screenshot:**Figure 3-5 End Application Upgrade**

```

C:\app\client\primalac\product\18.0.0\client_1\bin\sqlplus.exe
SQL> prompt Welcome to Application PDB Configuration
Welcome to Application PDB Configuration
SQL> SPOOL "85POOL_PATH"
Enter value for spool_path: D:\FCUBS_14.3\Upgrade_Patchset_Approach\Documents\Review\Attachment\AVAILS\06Spool.txt
SQL>
SQL> DECLARE
2   l_app_name  VARCHAR2(128);
3   l_sql       VARCHAR2(256);
4 BEGIN
5
6     SELECT app_name
7     INTO l_app_name
8     FROM dba_applications
9     WHERE app_implicit <> 'y'
10    AND app_name = (SELECT param_val FROM cstb_param WHERE param_name = 'MULTI_TENANT_APP_NAME');
11 EXCEPTION
12 WHEN NO_DATA_FOUND THEN
13     dbms_output.put_line('Error1 Nodata--->' || SQLERRM);
14 WHEN OTHERS THEN
15     dbms_output.put_line('Error1 others--->' || SQLERRM);
16 END;
17 l_sql := 'ALTER PLUGGABLE DATABASE APPLICATION ' || l_app_name || ' END UPGRADE ';
18 dbms_output.put_line('l_sql: ' || l_sql);
19 EXECUTE IMMEDIATE l_sql;
20
21 EXCEPTION
22 WHEN OTHERS THEN
23     DBMS_OUTPUT.PUT_LINE('Error --->' || SQLERRM);
24 END;
25 /
l_sql: ALTER PLUGGABLE DATABASE APPLICATION FCUBS END UPGRADE
PL/SQL procedure successfully completed.
SQL>
SQL> SET ERRORLOGGING OFF
SQL> SPOOL OFF
SQL>

```

5. Start Application upgrade

- a. Login into the Approot Schema as Common user.
- b. Run 05_Start_Upgrade.sql for initiating the application upgrade.
- c. User input has to be inputted for the below:

Table 3-4 Input sample for the script

Input Type	User Input
Spool Path	<< Any local path>>
Application next version	14.4.0.0.0

- d. Script will be executed similar to step 1 above and keep the SQL Plus session open for upcoming steps.

6. Application Root objects conversion for new objects

- a. Login into the Approot Schema as Common user.
- b. Run 06_New_Object_Conversion.sql for converting new approot objects added during patch-set as DL
- c. User input has to be inputted for the below:

Table 3-5 Input sample for the script

Input Type	User Input
Spool Path	<< Any local path>>
Application next version	HUBUSER (common user name)

Execution Screenshot:**Figure 3-6 Application Root objects conversion for new objects**

```

C:\app\client\primalac\product\18.0.0\client_1\bin\sqlplus.exe
SQL> prompt Welcome to Application PDB Configuration
Welcome to Application PDB Configuration
SQL> SPOOL "8SPOOL_PATH"
Enter value for spool_path: D:\FCUBS_14.3\Upgrade_Patchset_Approach\Documents\Review\Attachment\AVAILS\02Spool.txt
SQL>
SQL> DECLARE
2   l_count NUMBER;
3   l_app_deployment VARCHAR2(30);
4 BEGIN
5   SELECT count(*)
6     INTO l_count
7   FROM user_objects
8   WHERE sharing = 'NONE' --to get the new set of DL approot objects if any
9     AND object_name IN (SELECT DISTINCT a.object_name
10                        FROM cstm_approut_objects a
11                        WHERE sharing = 'DL'
12                        AND UPPER(object_type) = 'TABLE'
13                        AND EXISTS (SELECT 1
14                                FROM user_objects b
15                                WHERE b.object_name = a.object_name)
16                        AND EXISTS (SELECT 1
17                                FROM cstm_approut_functions_menu c
18                                WHERE c.function_id = a.function_id
19                                AND c.modifiable IN ('Y', 'S')));
20   dbms_output.put_line('l_count: ' || l_count);
21   IF l_count > 0 THEN
22     dbms_output.put_line('New DL objects are available');
23     SELECT param_val
24       INTO l_app_deployment
25     FROM cstm_param
26     WHERE param_name = 'MULTI_TENANT_DEPLOYMENT_MODEL';
27     dbms_output.put_line('l_app_deployment: ' || l_app_deployment);
28
29     IF l_app_deployment IS NOT NULL AND l_app_deployment = 'SAUA' THEN
30       UPDATE smtb_menu menu
31         SET menu.approut_flg = 'Y'
32       WHERE menu.function_id IN
33         (SELECT function_id
34          FROM cstm_approut_functions_menu
35          WHERE modifiable = 'S'
36          UNION
37          SELECT summary_fn_id
38            FROM cstm_approut_functions_menu
39            WHERE modifiable = 'S'
40            AND summary_fn_id IS NOT NULL) --SMS function id 'S'

```

Figure 3-7 Application Root objects conversion for new objects

```

C:\app\client\primalac\product\18.0.0\client_1\bin\sqlplus.exe
...
102   END IF;
103
104 EXCEPTION
105   WHEN OTHERS THEN
106     dbms_output.put_line('Error --->' || SQLERRM);
107 END;
108 /
Enter value for p_approut_user: HUBUSER
old 77:      FOR I IN (SELECT 'BEGIN ' || chr(10) || 'DBMS_PDB.SET_DATA_LINKED(''&P_APRROUT_USER'' ' ||
new 77:      FOR I IN (SELECT 'BEGIN ' || chr(10) || 'DBMS_PDB.SET_DATA_LINKED(''HUBUSER'' ' ||
l_count: 1
New DL objects are available
l_app_deployment: SASDD

BEGIN
DBMS_PDB.SET_DATA_LINKED('HUBUSER','CSTM_CHECK2',1);
EXCEPTION
WHEN OTHERS then
DBMS_OUTPUT.PUT_LINE('ERROR ->' || SQLERRM);
END;

PL/SQL procedure successfully completed.
SQL>
SQL> SET ERRORLOGGING OFF
SQL> SPOOL OFF
SQL>

```

7. Application Root objects conversion for existing objects

- a. Login into the Approot Schema as Common user.
- b. Run 07_Object_Conversion.sql for initiating the application upgrade.
- c. User input has to be inputted for the below:

Table 3-6 Input sample for the script

Input Type	User Input
Spool Path	<< Any local path>>
Application next version	HUBUSER (common user name)

Execution Screenshot:

Figure 3-8 Application Root objects conversion for existing objects

```
C:\app\client\pribalec\product\18.0.0\client_1\bin\sqlplus.exe
SQL> SET SERVEROUTPUT ON
SQL> SET ERRORLOGGING ON
SQL> SET ECHO ON
SQL> prompt Welcome to Upgrade object conversion
Welcome to Upgrade object conversion
SQL> SPOOL "85POOL_PATH"
Enter value for spool_path: D:\FCUBS_14.3\Upgrade_Patchset_Approach\Documents\Review\Attachment\AVAIL5\045Pool.txt
SQL>
SQL> DECLARE
  2   l_app_name          VARCHAR2(128);
  3 BEGIN
  4   BEGIN
  5     SELECT app_name
  6     INTO l_app_name
  7     FROM dba_applications
  8     WHERE app_implicit <> 'Y'
  9     AND app_name = (SELECT param_val FROM cstab_param WHERE Param_name = 'MULTI_TENANT_APP_NAME');
 10 EXCEPTION
 11   WHEN NO_DATA_FOUND THEN
 12     dbms_output.put_line('Error1 Nodata--->'||SQLERRM);
 13   WHEN OTHERS THEN
 14     dbms_output.put_line('Error1 others--->'||SQLERRM);
 15 END;
 16
 17 FOR I IN (SELECT 'BEGIN ' || chr(10) ||
 18             'DBMS_PDB.SET_METADATA_LINKED(''&P_APPROOT_USER'' || '','' ||
 19             Object_Name || '','' || Namespace || ')'; ' || chr(10) ||
 20             'EXCEPTION ' || chr(10) || 'WHEN OTHERS then ' || chr(10) ||
 21             'DBMS_OUTPUT.PUT_LINE(''ERROR ->' || SQLERRM); ' ||
 22             chr(10) || 'END;' sqlobject
 23         FROM user_objects
 24         WHERE sharing = 'NONE'
 25         AND object_type NOT IN ('INDEX', 'LOB', 'TABLE PARTITION','SEQUENCE')
 26         AND (object_name NOT LIKE '%K%')
 27         AND (created_appid = (select app_id from dba_applications where app_name = l_app_name) OR
 28            modified_appid = (select app_id from dba_applications where app_name = l_app_name)) ) LOOP
 29   DBMS_OUTPUT.PUT_LINE(chr(10));
 30   EXECUTE IMMEDIATE l_sqlobject;
 31 END LOOP;
 32 EXCEPTION
 33 WHEN OTHERS THEN
 34   DBMS_OUTPUT.PUT_LINE('Error --->' || SQLERRM);
 35 END;
 36 /
```

Figure 3-9 Application Root objects conversion for existing objects

```
C:\app\client\gribalac\product18.0.0\client_1\bin\sqlplus.exe
5      SELECT app_name
6      INTO l_app_name
7      FROM dba_applications
8      WHERE app_implicit <> 'Y'
9      AND app_name = (SELECT param_val FROM cstab_param WHERE Param_name = 'MULTI_TENANT_APP_NAME');
10 EXCEPTION
11 WHEN NO_DATA_FOUND THEN
12     dbms_output.put_line('Error1 Nodata--->' || SQLERRM);
13 WHEN OTHERS THEN
14     dbms_output.put_line('Error1 others--->' || SQLERRM);
15 END;
16
17 FOR I IN (SELECT 'BEGIN' || chr(10) ||
18             'DBMS_PDB.SET_METADATA_LINKED(''&P_APPROOT_USER'' || ',' || '' ||
19             'Object Name || ',' || Namespace || ',' || chr(10) ||
20             'EXCEPTION' || chr(10) || 'WHEN OTHERS THEN ' || chr(10) ||
21             'DBMS_OUTPUT.PUT_LINE(''ERROR ->' || SQLERRM); ' ||
22             chr(10) || 'END;' sqlobject
23         FROM user_objects
24         WHERE sharing = 'NONE'
25         AND object_type NOT IN ('INDEX', 'LOB', 'TABLE PARTITION', 'SEQUENCE')
26         AND (object_name NOT LIKE '%K%')
27         AND (created_appid = (select app_id from dba_applications where app_name = l_app_name) OR
28             modified_appid = (select app_id from dba_applications where app_name = l_app_name)) ) LOOP
29     DBMS_OUTPUT.PUT_LINE(chr(10));
30     EXECUTE IMMEDIATE I.sqlobject;
31 END LOOP;
32 EXCEPTION
33 WHEN OTHERS THEN
34     DBMS_OUTPUT.PUT_LINE('Error --->' || SQLERRM);
35 END;
36 /
Enter value for p_approot_user: HUBUSER
pid 18:          'DBMS_PDB.SET_METADATA_LINKED(''&P_APPROOT_USER'' || ',' || '' ||
new 18:          'DBMS_PDB.SET_METADATA_LINKED(''HUBUSER'' || ',' || '' ||

PL/SQL procedure successfully completed.

SQL>
SQL> SET ERRORLOGGING OFF
SQL> SPOOL OFF
SQL>
```

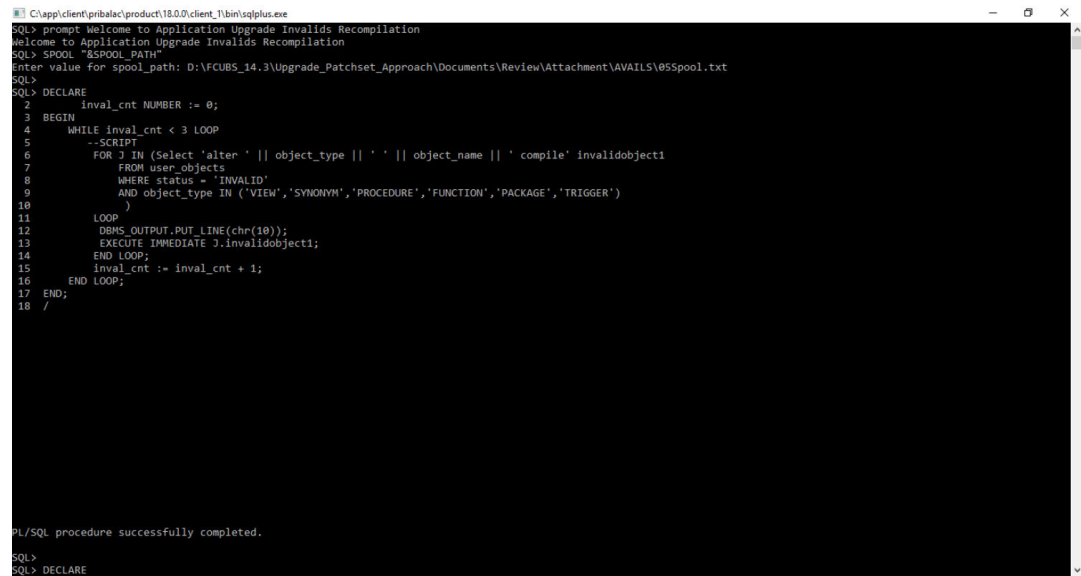
8. Recompilation of invalids

- a. Login into the Approot Schema as Common user.

- b. Run `08_Invalids_Recompilation.sql` for recompiling the invalids during application upgrade.
- c. No user input is required for this step.
- d. Script will be executed as in the screen shot below and keep the SQL Plus session open for upcoming steps.

Execution Screenshot:

Figure 3-10 Recompilation of Invalids



```

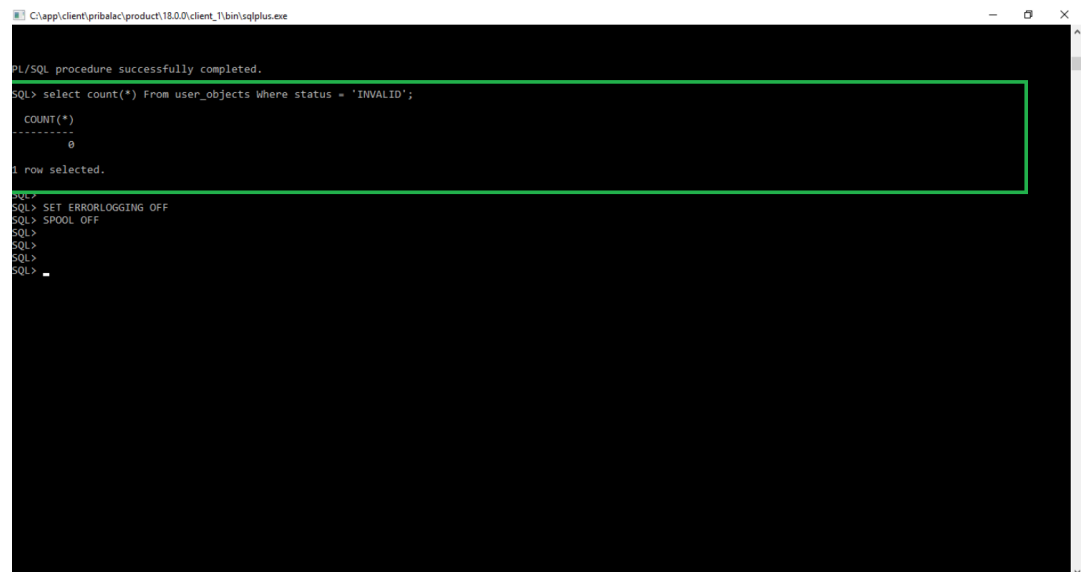
C:\app\client\primalac\product\18.0.0\client_1\bin\sqlplus.exe
SQL> prompt Welcome to Application Upgrade Invalids Recompilation
Welcome to Application Upgrade Invalids Recompilation
SQL> SPOOL "SSPOOL_PATH"
Enter value for spool_path: D:\FCUBS_14.3\Upgrade_Patchset_Approach\Documents\Review\Attachment\AVAILS\055pool.txt
SQL>
SQL> DECLARE
2   inval_cnt NUMBER := 0;
3 BEGIN
4   WHILE inval_cnt < 3 LOOP
5     --SCRIPT
6     FOR J IN (Select 'alter ' || object_type || ' ' || object_name || ' compile' invalidobject1
7               FROM user_objects
8               WHERE status = 'INVALID'
9               AND object_type IN ('VIEW','SYNONYM','PROCEDURE','FUNCTION','PACKAGE','TRIGGER'))
10    LOOP
11      DBMS_OUTPUT.PUT_LINE(chr(10));
12      EXECUTE IMMEDIATE J.invalidobject1;
13    END LOOP;
14    inval_cnt := inval_cnt + 1;
15  END LOOP;
16 END;
17 /
18 /

PL/SQL procedure successfully completed.

SQL> DECLARE
SQL>

```

Figure 3-11 Recompilation of Invalids



```

C:\app\client\primalac\product\18.0.0\client_1\bin\sqlplus.exe

PL/SQL procedure successfully completed.

SQL> select count(*) From user_objects Where status = 'INVALID';

   COUNT(*)
-----
          0

1 row selected.

SQL>
SQL> SET ERRORLOGGING OFF
SQL> SPOOL OFF
SQL>
SQL>
SQL>
SQL>

```

9. End Application upgrade

- a. Login into the Approot Schema as Common user.

- b. Run 06_End_Upgrade.sql for recompiling the invalids during application upgrade.
 - c. No user input is required for this step.
 - d. Script will be executed as that of step 4.
10. **Synchronize application PDBs**
- a. Login into the PDB Schema as Common user. For each PDB, this steps has to be done individually.
 - b. Run 07_PDB_Sync.sql for syncing the application upgrade with PDBs.
 - c. No user input is required for this step.
 - d. Script will be executed as in the screen shot below.

Execution Screenshot:

Figure 3-12 synch

```

C:\app\client\gribalac\product\18.0.0\client_1\bin\sqlplus.exe

SQL> SPOOL ON
SQL> SET SQLBLANKLINES ON
SQL> SET SERVEROUTPUT ON
SQL> SET ERRORLOGGING ON
SQL> SET ECHO ON
SQL> prompt Welcome to Application PDB Sync
Welcome to Application PDB Sync
SQL> SPOOL "8SPOOL_PATH"
Enter value for spool_path: D:\FCUBS_14.3\Upgrade_Patchset_Approach\Documents\Review\Attachment\AVAILS\08Spool.txt
SQL>
SQL> DECLARE
2   l_app_name  VARCHAR2(128);
3   l_sql       VARCHAR2(256);
4 BEGIN
5   BEGIN
6     SELECT app_name
7     INTO l_app_name
8     FROM dba_applications
9     WHERE app_implicit <> 'Y';
10  EXCEPTION
11    WHEN NO_DATA_FOUND THEN
12      dbms_output.put_line('Error1 Nodata---'||SQLERRM);
13    WHEN OTHERS THEN
14      dbms_output.put_line('Error1 others---'||SQLERRM);
15  END;
16  l_sql := 'ALTER PLUGGABLE DATABASE APPLICATION ' || l_app_name || ' SYNC ';
17  dbms_output.put_line('l_sql: ' || l_sql);
18  EXECUTE IMMEDIATE l_sql;
19
20 EXCEPTION
21 WHEN OTHERS THEN
22   dbms_output.put_line('Error ---'||SQLERRM);
23 END;
24 /
l_sql: ALTER PLUGGABLE DATABASE APPLICATION FCUBS SYNC
PL/SQL procedure successfully completed.

SQL>
SQL> SET ERRORLOGGING OFF
SQL> SPOOL OFF
SQL>

```


A

Annexure

01_Start_Upgrade.sql

```
SET VERIFY ON
SET HEAD ON
SET FEEDBACK 1
SET ARRAY 1
SET LINESIZE 10000
SET PAGESIZE 50000
SET LONG 10000
SET ECHO ON
SET TRIMSPPOOL ON
SET COLSEP ';'
SET SERVEROUT OFF
clear screen
SPOOL ON
SET SQLBLANKLINES ON
SET SERVEROUTPUT ON
SET ERRORLOGGING ON
SET ECHO ON
prompt Welcome to Application Upgrade initiation
SPOOL "&SPOOL_PATH"

DECLARE
    l_app_name    VARCHAR2(128);
    l_app_currver VARCHAR2(30);
    l_Sql         VARCHAR2(256);
BEGIN
    BEGIN
        SELECT app_name
            INTO l_app_name
            FROM dba_applications
            WHERE app_implicit <> 'Y'
            AND app_name = (SELECT param_val FROM cstb_param WHERE Param_name =
'MULTI_TENANT_APP_NAME');
    EXCEPTION
        WHEN NO_DATA_FOUND THEN
            dbms_output.put_line('Error1 Nodata--->' || SQLERRM);
        WHEN OTHERS THEN
            dbms_output.put_line('Error1 others--->' || SQLERRM);
    END;

    BEGIN
        SELECT MAX(app_version)
            INTO l_app_currver
            FROM dba_app_versions
            WHERE app_name = l_app_name;
    EXCEPTION
```

```

        WHEN NO_DATA_FOUND THEN
            dbms_output.put_line('Error2 Nodata--->'||SQLERRM);
        WHEN OTHERS THEN
            dbms_output.put_line('Error2 others--->'||SQLERRM);
    END;

    l_sql := 'ALTER PLUGGABLE DATABASE APPLICATION ' || l_app_name||' BEGIN
    UPGRADE '''|| l_app_currver || ''' TO '''|| '&P_APPLICATION_NEXTVER' ||'''';
    dbms_output.put_line('l_sql: ' || l_sql);
    EXECUTE IMMEDIATE l_sql;

    l_sql := 'ALTER SYSTEM SET DEFAULT_SHARING = NONE';
    dbms_output.put_line('l_sql: ' || l_sql);
    EXECUTE IMMEDIATE l_sql;

EXCEPTION
    WHEN OTHERS THEN
        dbms_output.put_line('Error --->'||SQLERRM);
END;
/

SET ERRORLOGGING OFF
SPOOL OFF

```

03_Invalids_Recompilation_Inside_Upgrade.sql

```

/* Script for Shared Application + Shared Data */
SET VERIFY ON
SET HEAD ON
SET FEEDBACK 1
SET ARRAY 1
SET LINESIZE 10000
SET PAGESIZE 50000
SET LONG 10000
SET ECHO ON
SET TRIMSPPOOL ON
SET COLSEP ';'
SET SERVEROUT OFF
clear screen
SPOOL ON
SET SQLBLANKLINES ON
SET SERVEROUTPUT ON
SET ERRORLOGGING ON
SET ECHO ON
prompt Welcome to Application Upgrade Invalids Recompilation
SPOOL "&SPOOL_PATH"

DECLARE
    inval_cnt          NUMBER := 0;
    l_object_name      VARCHAR2(240);
BEGIN
    WHILE inval_cnt < 3 LOOP
        --SCRIPT
        FOR J IN (Select 'alter ' || object_type || ' ' || object_name ||'
compile' invalidobject1,

```

```

        object_name
        FROM user_objects
        WHERE status = 'INVALID'
        AND created_appid IS NOT NULL
        AND object_type IN
('VIEW', 'SYNONYM', 'PROCEDURE', 'FUNCTION', 'PACKAGE', 'TRIGGER', 'MATERIALIZED
VIEW'))
    LOOP
        BEGIN
            l_object_name := j.object_name;
            dbms_output.put_line(chr(10));
            EXECUTE IMMEDIATE J.invalidobject1;
        EXCEPTION
            WHEN OTHERS THEN
                dbms_output.put_line('failed for -->' || l_object_name);
        END;
    END LOOP;
    inval_cnt := inval_cnt + 1;
END LOOP;
EXCEPTION
    WHEN OTHERS THEN
        dbms_output.put_line('FAILED FOR -->' || l_object_name);
END;
/
DECLARE
    inval_cnt1        NUMBER := 0;
    l_object_name      VARCHAR2(240);
BEGIN
    WHILE inval_cnt1 < 3 LOOP
        --SCRIPT
        FOR k IN (Select 'alter package ' || object_name || ' compile body'
invalobject2,
                object_name
                FROM user_objects
                WHERE status = 'INVALID'
                AND created_appid IS NOT NULL
                AND object_type IN ('PACKAGE BODY'))
        LOOP
            BEGIN
                l_object_name := k.object_name;
                dbms_output.put_line(chr(10));
                EXECUTE IMMEDIATE k.invalidobject2;
            EXCEPTION
                WHEN OTHERS THEN
                    dbms_output.put_line('FAILED FOR -->' || l_object_name);
            END;
        END LOOP;
        inval_cnt1 := inval_cnt1 + 1;
    END LOOP;
EXCEPTION
    WHEN OTHERS THEN
        dbms_output.put_line('FAILED FOR -->' || l_object_name);
END;
/
select count(*) From user_objects Where status = 'INVALID';

```

```
SET ERRORLOGGING OFF
SPOOL OFF
```

04_End_Upgrade.sql

```
/* Pre-requisites: Step 3 on Application associated pdb creation is completed
*/
SET VERIFY ON
SET HEAD ON
SET FEEDBACK 1
SET ARRAY 1
SET LINESIZE 10000
SET PAGESIZE 50000
SET LONG 10000
SET ECHO ON
SET TRIMSPPOOL ON
SET COLSEP ';'
SET SERVEROUT OFF
clear screen
SPOOL ON
SET SQLBLANKLINES ON
SET SERVEROUTPUT ON
SET ERRORLOGGING ON
SET ECHO ON
prompt Welcome to Application end Upgrade
SPOOL "&SPOOL_PATH"

DECLARE
    l_app_name    VARCHAR2(128);
    l_sql         VARCHAR2(256);
BEGIN
    BEGIN
        SELECT app_name
            INTO l_app_name
            FROM dba_applications
            WHERE app_implicit <> 'Y'
              AND app_name = (SELECT param_val FROM cstb_param WHERE param_name
= 'MULTI_TENANT_APP_NAME');
    EXCEPTION
        WHEN NO_DATA_FOUND THEN
            dbms_output.put_line('Error1 Nodata--->' || SQLERRM);
        WHEN OTHERS THEN
            dbms_output.put_line('Error1 others--->' || SQLERRM);
    END;
    l_sql := 'ALTER PLUGGABLE DATABASE APPLICATION ' || l_app_name || ' END
UPGRADE ';
    dbms_output.put_line('l_sql: ' || l_sql);

    EXECUTE IMMEDIATE l_sql;

EXCEPTION
WHEN OTHERS THEN
    DBMS_OUTPUT.PUT_LINE('Error --->' || SQLERRM);
END;
/
```

```
SET ERRORLOGGING OFF
SPOOL OFF
```

04_Invalids_Recompilation_Outside_Upgrade.sql

```
/* Script for Shared Application + Shared Data */
SET VERIFY ON
SET HEAD ON
SET FEEDBACK 1
SET ARRAY 1
SET LINESIZE 10000
SET PAGESIZE 50000
SET LONG 10000
SET ECHO ON
SET TRIMSPPOOL ON
SET COLSEP ';'
SET SERVEROUT OFF
clear screen
SPOOL ON
SET SQLBLANKLINES ON
SET SERVEROUTPUT ON
SET ERRORLOGGING ON
SET ECHO ON
prompt Welcome to Application Upgrade Invalids Recompilation
SPOOL "&SPOOL_PATH"

DECLARE
    inval_cnt      NUMBER := 0;
    l_object_name  VARCHAR2(240);
BEGIN
    WHILE inval_cnt < 3 LOOP
        --SCRIPT
        FOR J IN (Select 'alter ' || object_type || ' ' || object_name || '
compile' invalidobject1,
                    object_name
                  FROM user_objects
                  WHERE status = 'INVALID'
                  AND created_appid IS NULL
                  AND object_type IN
('VIEW','SYNONYM','PROCEDURE','FUNCTION','PACKAGE','TRIGGER','MATERIALIZED
VIEW'))
        LOOP
            BEGIN
                l_object_name := j.object_name;
                dbms_output.put_line(chr(10));
                EXECUTE IMMEDIATE J.invalidobject1;
            EXCEPTION
                WHEN OTHERS THEN
                    dbms_output.put_line('failed for -->' || l_object_name);
            END;
        END LOOP;
        inval_cnt := inval_cnt + 1;
    END LOOP;
EXCEPTION
```

```

        WHEN OTHERS THEN
            dbms_output.put_line('FAILED FOR -->' || l_object_name);
    END;
/
DECLARE
    inval_cnt1        NUMBER := 0;
    l_object_name      VARCHAR2(240);
BEGIN
    WHILE inval_cnt1 < 3 LOOP
        --SCRIPT
        FOR k IN (Select 'alter package ' || object_name || ' compile body'
invalidobject2,
                object_name
                FROM user_objects
                WHERE status = 'INVALID'
                AND created_appid IS NULL
                AND object_type IN ('PACKAGE BODY'))
        LOOP
            BEGIN
                l_object_name := k.object_name;
                dbms_output.put_line(chr(10));
                EXECUTE IMMEDIATE k.invalidobject2;
            EXCEPTION
                WHEN OTHERS THEN
                    dbms_output.put_line('FAILED FOR -->' || l_object_name);
            END;
        END LOOP;
        inval_cnt1 := inval_cnt1 + 1;
    END LOOP;
EXCEPTION
WHEN OTHERS THEN
    dbms_output.put_line('FAILED FOR -->' || l_object_name);
END;
/
select count(*) From user_objects Where status = 'INVALID';

SET ERRORLOGGING OFF
SPOOL OFF

```

05_Start_Upgrade.sql

```

SET VERIFY ON
SET HEAD ON
SET FEEDBACK 1
SET ARRAY 1
SET LINESIZE 10000
SET PAGESIZE 50000
SET LONG 10000
SET ECHO ON
SET TRIMSPPOOL ON
SET COLSEP ';'
SET SERVEROUT OFF
clear screen
SPOOL ON
SET SQLBLANKLINES ON

```

```

SET SERVEROUTPUT ON
SET ERRORLOGGING ON
SET ECHO ON
prompt Welcome to Application Upgrade initiation
SPOOL "&SPOOL_PATH"

DECLARE
    l_app_name    VARCHAR2(128);
    l_app_currver VARCHAR2(30);
    l_sql         VARCHAR2(256);
BEGIN
    BEGIN
        SELECT app_name
        INTO l_app_name
        FROM dba_applications
        WHERE app_implicit <> 'Y'
        AND app_name = (SELECT param_val FROM cstb_param WHERE Param_name =
'MULTI_TENANT_APP_NAME');
    EXCEPTION
        WHEN NO_DATA_FOUND THEN
            dbms_output.put_line('Error1 Nodata--->' || SQLERRM);
        WHEN OTHERS THEN
            dbms_output.put_line('Error1 others--->' || SQLERRM);
    END;

    BEGIN
        SELECT MAX(app_version)
        INTO l_app_currver
        FROM dba_app_versions
        WHERE app_name = l_app_name;
    EXCEPTION
        WHEN NO_DATA_FOUND THEN
            dbms_output.put_line('Error2 Nodata--->' || SQLERRM);
        WHEN OTHERS THEN
            dbms_output.put_line('Error2 others--->' || SQLERRM);
    END;

    l_sql := 'ALTER PLUGGABLE DATABASE APPLICATION ' || l_app_name || ' BEGIN
UPGRADE ''' || l_app_currver || ''' TO ''' || '&P_APPLICATION_NEXTVER' || ''';
    dbms_output.put_line('l_sql: ' || l_sql);
    EXECUTE IMMEDIATE l_sql;

    l_sql := 'ALTER SYSTEM SET DEFAULT_SHARING = NONE';
    dbms_output.put_line('l_sql: ' || l_sql);
    EXECUTE IMMEDIATE l_sql;

EXCEPTION
    WHEN OTHERS THEN
        dbms_output.put_line('Error --->' || SQLERRM);
END;
/

SET ERRORLOGGING OFF
SPOOL OFF

```

06_New_Object_Conversion.sql

```

/*      Script      for      Shared      Object      Conversion      for      patch-set
*/
SET VERIFY ON
SET HEAD ON
SET FEEDBACK 1
SET ARRAY 1
SET LINESIZE 10000
SET PAGESIZE 50000
SET LONG 10000
SET ECHO ON
SET TRIMSPOOL ON
SET COLSEP ';'
SET SERVEROUT OFF
clear screen
SPOOL ON
SET SQLBLANKLINES ON
SET SERVEROUTPUT ON
SET ERRORLOGGING ON
SET ECHO ON
prompt Welcome to Upgrade New object Conversion
SPOOL    "&SPOOL_PATH"

DECLARE
    l_count          NUMBER;
    l_app_deployment VARCHAR2(30);
BEGIN
    SELECT count(*)
       INTO l_count
       FROM user_objects
      WHERE sharing = 'NONE' --to get the new set of DL approot objects if any
         AND object_name IN
            (SELECT DISTINCT a.object_name
              FROM cstm_approot_objects a
             WHERE sharing = 'DL'
               AND UPPER(object_type) = 'TABLE'
               AND EXISTS (SELECT 1
                           FROM user_objects b
                          WHERE b.object_name = a.object_name)
               AND EXISTS (SELECT 1
                           FROM cstm_approot_functions_menu c
                          WHERE c.function_id = a.function_id
                             AND c.modifiable IN ('Y', 'S')));
    dbms_output.put_line('l_count:      ' || l_count);

    IF l_count > 0 THEN
        dbms_output.put_line('New DL objects are available');
        SELECT param_val
           INTO l_app_deployment
           FROM cstb_param
          WHERE param_name = 'MULTI_TENANT_DEPLOYMENT_MODEL';
        dbms_output.put_line('l_app_deployment: ' || l_app_deployment);

        IF l_app_deployment IS NOT NULL AND l_app_deployment = 'SAUA' THEN

```



```

UPDATE smtb_menu menu
  SET menu.approot_flg = 'Y'
  WHERE menu.function_id IN
    (SELECT function_id
     FROM cstm_approot_functions_menu
     WHERE modifiable = 'S'
    UNION
     SELECT summary_fn_id
     FROM cstm_approot_functions_menu
     WHERE modifiable = 'S'
     AND summary_fn_id IS NOT NULL) --SMS function id 'S'
  AND menu.approot_flg <> 'Y'; --excluding the already modified
  approot function ids in menu.
ELSIF l_app_deployment IS NOT NULL AND l_app_deployment = 'SASDD' THEN
  UPDATE smtb_menu menu
    SET menu.approot_flg = 'Y'
    WHERE menu.function_id IN
      (SELECT function_id
       FROM cstm_approot_functions_menu
       UNION
        SELECT summary_fn_id
        FROM cstm_approot_functions_menu
        WHERE summary_fn_id IS NOT NULL)
      AND menu.approot_flg <> 'Y'; --excluding the already modified
      approot function ids in menu.
  ELSIF l_app_deployment IS NOT NULL AND l_app_deployment = 'SASDC' THEN
    /*Assumption new table cstm_approot_menu_custom_movedtopdb will be
    available
    and is populated with the function ids which are moved to PDB as
    part of custom deployment
    It has 2 columns FUNCTION_ID and SUMMARY_FN_ID*/

    UPDATE smtb_menu menu
      SET menu.approot_flg = 'Y'
      WHERE menu.function_id IN
        (SELECT function_id
         FROM cstm_approot_functions_menu
         UNION
          SELECT summary_fn_id
          FROM cstm_approot_functions_menu
          WHERE summary_fn_id IS NOT NULL)
        AND menu.function_id NOT IN --excluding the function ids moved
        to PDB already.
        (SELECT function_id
         FROM cstm_approot_menu_movedtopdb
        UNION
         SELECT summary_fn_id
         FROM cstm_approot_menu_movedtopdb
         WHERE summary_fn_id IS NOT NULL)
        AND menu.approot_flg <> 'Y'; --excluding the already modified
        approot function ids in menu.
    END IF;

  BEGIN
    FOR I IN (SELECT 'BEGIN ' || chr(10) ||
                  'DBMS_PDB.SET_DATA_LINKED('&P_APPROOT_USER' ' ||

```

```

', '' ||
                                Object_Name || ', ' || Namespace || '); ' ||
chr(10) ||
                                'EXCEPTION ' || chr(10) ||
                                'WHEN OTHERS THEN ' || chr(10) ||
                                'DBMS_OUTPUT.PUT_LINE(''ERROR ->' || SQLERRM); ' ||
                                chr(10) || 'END;' sqlobject
                                FROM user_objects
                                WHERE sharing = 'NONE' --to get the new set of DL
aproot objects if any
                                AND object_name IN
                                (SELECT DISTINCT a.object_name
                                 FROM cstm_aproot_objects a
                                 WHERE sharing = 'DL'
                                 AND UPPER(object_type) = 'TABLE'
                                 AND EXISTS (SELECT 1
                                             FROM user_objects b
                                             WHERE b.object_name = a.object_name)
                                 AND EXISTS
                                 (SELECT 1
                                  FROM cstm_aproot_functions_menu c
                                  WHERE c.function_id = a.function_id
                                  AND c.modifiable IN ('Y', 'S')))) LOOP
                                DBMS_OUTPUT.PUT_LINE(chr(10));
                                EXECUTE IMMEDIATE I.sqlobject;
                                DBMS_OUTPUT.PUT_LINE(I.sqlobject);
                                END LOOP;
                                EXCEPTION
                                WHEN OTHERS THEN
                                    DBMS_OUTPUT.PUT_LINE('Error --->' || SQLERRM);
                                END;
                                ELSE
                                    dbms_output.put_line('No new DL objects available');
                                END IF;
                                EXCEPTION
                                WHEN OTHERS THEN
                                    dbms_output.put_line('Error --->' || SQLERRM);
                                END;
                                /

SET ERRORLOGGING OFF
SPOOL OFF

```

07_Object_Conversion.sql

```

SET VERIFY ON
SET HEAD ON
SET FEEDBACK 1
SET ARRAY 1
SET LINESIZE 10000
SET PAGESIZE 50000
SET LONG 10000
SET ECHO ON
SET TRIMSPPOOL ON
SET COLSEP ';'

```

```

SET SERVEROUT OFF
clear screen
SPOOL ON
SET SQLBLANKLINES ON
SET SERVEROUTPUT ON
SET ERRORLOGGING ON
SET ECHO ON
prompt Welcome to Upgrade object conversion
SPOOL "&SPOOL_PATH"
BEGIN
    FOR I IN (SELECT 'BEGIN ' || chr(10) ||
                    'DBMS_PDB.SET_METADATA_LINKED('&P_APPROOT_USER''' ||
                    ', ''' ||
                    Object_Name || ', ' || Namespace || '); ' || chr(10)
                    ||
                    'EXCEPTION ' || chr(10) || 'WHEN OTHERS then ' ||
chr(10) ||
                    'DBMS_OUTPUT.PUT_LINE(''ERROR ->' || SQLERRM); ' ||
                    chr(10) || 'END;' sqlobject
            FROM user_objects
            WHERE sharing = 'NONE'
              AND object_type NOT IN ('INDEX', 'LOB', 'TABLE
PARTITION', 'SEQUENCE', 'JOB', 'MATERIALIZED VIEW', 'MATERIALIZED VIEW LOG')
              AND application = 'Y'
              AND (object_name,object_type) NOT IN (SELECT
object_name,object_type
                                                    FROM
cstm_approot_objects
                                                    WHERE function_id
= 'DYNAMIC'
                                                    AND sharing
= 'NONE'
                                                    )
            ) LOOP
        dbms_output.put_line(chr(10));
        EXECUTE IMMEDIATE I.sqlobject;
        dbms_output.put_line(I.sqlobject);
    END LOOP;
EXCEPTION
WHEN OTHERS THEN
    dbms_output.put_line('Error --->' || SQLERRM);
END;
/
SET ERRORLOGGING OFF
SPOOL OFF

```

08_Invalids_Recompilation_Inside_Upgrade.sql

```

/* Script for Shared Application + Shared Data */
SET VERIFY ON
SET HEAD ON
SET FEEDBACK 1
SET ARRAY 1
SET LINESIZE 10000
SET PAGESIZE 50000

```

```

SET LONG 10000
SET ECHO ON
SET TRIMSPOOL ON
SET COLSEP ';'
SET SERVEROUT OFF
clear screen
SPOOL ON
SET SQLBLANKLINES ON
SET SERVEROUTPUT ON
SET ERRORLOGGING ON
SET ECHO ON
prompt Welcome to Application Upgrade Invalids Recompilation
SPOOL "&SPOOL_PATH"

DECLARE
    inval_cnt          NUMBER := 0;
    l_object_name       VARCHAR2(240);
BEGIN
    WHILE inval_cnt < 3 LOOP
        --SCRIPT
        FOR J IN (Select 'alter ' || object_type || ' ' || object_name || '
compile' invalidobject1,
                    object_name
                  FROM user_objects
                  WHERE status = 'INVALID'
                  AND created_appid IS NOT NULL
                  AND object_type IN
('VIEW', 'SYNONYM', 'PROCEDURE', 'FUNCTION', 'PACKAGE', 'TRIGGER', 'MATERIALIZED
VIEW'))
        LOOP
            BEGIN
                l_object_name := j.object_name;
                dbms_output.put_line(chr(10));
                EXECUTE IMMEDIATE J.invalidobject1;
            EXCEPTION
                WHEN OTHERS THEN
                    dbms_output.put_line('failed for -->' || l_object_name);
            END;
        END LOOP;
        inval_cnt := inval_cnt + 1;
    END LOOP;
EXCEPTION
    WHEN OTHERS THEN
        dbms_output.put_line('FAILED FOR -->' || l_object_name);
END;
/
DECLARE
    inval_cnt1          NUMBER := 0;
    l_object_name       VARCHAR2(240);
BEGIN
    WHILE inval_cnt1 < 3 LOOP
        --SCRIPT
        FOR k IN (Select 'alter package ' || object_name || ' compile body'
invalidobject2,
                    object_name
                  FROM user_objects

```

```

        WHERE status = 'INVALID'
        AND created_appid IS NOT NULL
        AND object_type IN ('PACKAGE BODY'))
    LOOP
        BEGIN
            l_object_name := k.object_name;
            dbms_output.put_line(chr(10));
            EXECUTE IMMEDIATE k.invalidobject2;
        EXCEPTION
            WHEN OTHERS THEN
                dbms_output.put_line('FAILED FOR -->' || l_object_name);
            END;
        END LOOP;
        inval_cnt1 := inval_cnt1 + 1;
    END LOOP;
EXCEPTION
WHEN OTHERS THEN
    dbms_output.put_line('FAILED FOR -->' || l_object_name);
END;
/
select count(*) From user_objects Where status = 'INVALID';

SET ERRORLOGGING OFF
SPOOL OFF

```

09_End_Upgrade.sql

```

/* Pre-requisites: Step 3 on Application associated pdb creation is completed
*/
SET VERIFY ON
SET HEAD ON
SET FEEDBACK 1
SET ARRAY 1
SET LINESIZE 10000
SET PAGESIZE 50000
SET LONG 10000
SET ECHO ON
SET TRIMSPPOOL ON
SET COLSEP ';'
SET SERVEROUT OFF
clear screen
SPOOL ON
SET SQLBLANKLINES ON
SET SERVEROUTPUT ON
SET ERRORLOGGING ON
SET ECHO ON
prompt Welcome to Application end Upgrade
SPOOL "&SPOOL_PATH"

DECLARE
    l_app_name VARCHAR2(128);
    l_sql VARCHAR2(256);
BEGIN
    BEGIN
        SELECT app_name

```

```

        INTO l_app_name
        FROM dba_applications
        WHERE app_implicit <> 'Y'
        AND app_name = (SELECT param_val FROM cstb_param WHERE param_name
= 'MULTI_TENANT_APP_NAME');
    EXCEPTION
        WHEN NO_DATA_FOUND THEN
            dbms_output.put_line('Error1 Nodata--->' || SQLERRM);
        WHEN OTHERS THEN
            dbms_output.put_line('Error1 others--->' || SQLERRM);
    END;
    l_sql := 'ALTER PLUGGABLE DATABASE APPLICATION ' || l_app_name || ' END
UPGRADE ';
    dbms_output.put_line('l_sql: ' || l_sql);

    EXECUTE IMMEDIATE l_sql;

EXCEPTION
WHEN OTHERS THEN
    DBMS_OUTPUT.PUT_LINE('Error --->' || SQLERRM);
END;
/

SET ERRORLOGGING OFF
SPOOL OFF

```

09_Invalids_Recompilation_Outside_Upgrade.sql

```

/* Script for Shared Application + Shared Data */
SET VERIFY ON
SET HEAD ON
SET FEEDBACK 1
SET ARRAY 1
SET LINESIZE 10000
SET PAGESIZE 50000
SET LONG 10000
SET ECHO ON
SET TRIMSPPOOL ON
SET COLSEP ';'
SET SERVEROUT OFF
clear screen
SPOOL ON
SET SQLBLANKLINES ON
SET SERVEROUTPUT ON
SET ERRORLOGGING ON
SET ECHO ON
prompt Welcome to Application Upgrade Invalids Recompilation
SPOOL "&SPOOL_PATH"

DECLARE
    inval_cnt          NUMBER := 0;
    l_object_name      VARCHAR2(240);
BEGIN
    WHILE inval_cnt < 3 LOOP
        --SCRIPT
    
```

```

        FOR J IN (Select 'alter ' || object_type || ' ' || object_name ||'
compile' invalidobject1,
        object_name
        FROM user_objects
        WHERE status = 'INVALID'
        AND created_appid IS NULL
        AND object_type IN
('VIEW', 'SYNONYM', 'PROCEDURE', 'FUNCTION', 'PACKAGE', 'TRIGGER', 'MATERIALIZED
VIEW'))
    LOOP
        BEGIN
            l_object_name := j.object_name;
            dbms_output.put_line(chr(10));
            EXECUTE IMMEDIATE J.invalidobject1;
        EXCEPTION
            WHEN OTHERS THEN
                dbms_output.put_line('failed for -->' || l_object_name);
        END;
    END LOOP;
    inval_cnt := inval_cnt + 1;
END LOOP;
EXCEPTION
    WHEN OTHERS THEN
        dbms_output.put_line('FAILED FOR -->' || l_object_name);
END;
/
DECLARE
    inval_cnt1        NUMBER := 0;
    l_object_name     VARCHAR2(240);
BEGIN
    WHILE inval_cnt1 < 3 LOOP
        --SCRIPT
        FOR k IN (Select 'alter package ' || object_name ||' compile body'
invalidobject2,
        object_name
        FROM user_objects
        WHERE status = 'INVALID'
        AND created_appid IS NULL
        AND object_type IN ('PACKAGE BODY'))
    LOOP
        BEGIN
            l_object_name := k.object_name;
            dbms_output.put_line(chr(10));
            EXECUTE IMMEDIATE k.invalidobject2;
        EXCEPTION
            WHEN OTHERS THEN
                dbms_output.put_line('FAILED FOR -->' || l_object_name);
        END;
    END LOOP;
    inval_cnt1 := inval_cnt1 + 1;
END LOOP;
EXCEPTION
    WHEN OTHERS THEN
        dbms_output.put_line('FAILED FOR -->' || l_object_name);
END;
/

```

```
select count(*) From user_objects Where status = 'INVALID';
```

```
SET ERRORLOGGING OFF
```

```
SPOOL OFF
```

10_PDB_Sync.sql

```
SET VERIFY ON
```

```
SET HEAD ON
```

```
SET FEEDBACK 1
```

```
SET ARRAY 1
```

```
SET LINESIZE 10000
```

```
SET PAGESIZE 50000
```

```
SET LONG 10000
```

```
SET ECHO ON
```

```
SET TRIMSPPOOL ON
```

```
SET COLSEP ';
```

```
SET SERVEROUT OFF
```

```
clear screen
```

```
SPOOL ON
```

```
SET SQLBLANKLINES ON
```

```
SET SERVEROUTPUT ON
```

```
SET ERRORLOGGING ON
```

```
SET ECHO ON
```

```
prompt Welcome to Application PDB Sync
```

```
SPOOL "&SPOOL_PATH"
```

```
DECLARE
```

```
    l_app_name VARCHAR2(128);
```

```
    l_sql VARCHAR2(256);
```

```
BEGIN
```

```
    BEGIN
```

```
        SELECT app_name
```

```
            INTO l_app_name
```

```
            FROM dba_applications
```

```
            WHERE app_implicit <> 'Y';
```

```
    EXCEPTION
```

```
        WHEN NO_DATA_FOUND THEN
```

```
            dbms_output.put_line('Error1 Nodata--->' || SQLERRM);
```

```
        WHEN OTHERS THEN
```

```
            dbms_output.put_line('Error1 others--->' || SQLERRM);
```

```
    END;
```

```
    l_sql := 'ALTER PLUGGABLE DATABASE APPLICATION ' || l_app_name || ' SYNC ';
```

```
    dbms_output.put_line('l_sql: ' || l_sql);
```

```
    EXECUTE IMMEDIATE l_sql;
```

```
EXCEPTION
```

```
WHEN OTHERS THEN
```

```
    dbms_output.put_line('Error --->' || SQLERRM);
```

```
END;
```

```
/
```

```
SET ERRORLOGGING OFF
```

```
SPOOL OFF
```


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